Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Amendment of Part 15 of the	)	ET Docket No. 14-165
Commission's Rules for Unlicensed	)	
Operations in the Television Bands,	)	RM-11840
Repurposed 600 MHz Band, 600 MHz	)	
Guard bands and Duplex Gap, and	)	
Channel 37	)	
	)	

COMMENTS OF SACRED WIND COMMUNICATONS, INC. SUPPORTING MICROSOFT CORPORATION'S PETITION FOR RULEMAKING

June 5, 2019

I. INTRODUCTION AND SUMMARY

Sacred Wind Communications, Inc. ("Sacred Wind") is a rural local exchange carrier incorporated and operating in New Mexico, having acquired an underserved and unserved service territory in northwestern New Mexico from Qwest Corporation in 2006. Nearly all of Sacred Wind's 3,200 square mile study area lies within Navajo tribal lands and 98 percent of its customer base is Navajo, over 40 percent of whom have incomes below the national poverty level. Using a mix of telecommunications technologies, Sacred Wind has succeeded since its inception in increasing voice service from 26 percent coverage of total locations within its study area to over 90 percent and broadband service from zero in 2006 to over 90 percent. Sacred Wind is best known for the extent and quality of its fiber to fixed wireless network and has been a pioneer and innovator in its development of a systems model suitable for many remote, rural and tribal areas. Yet, there remain areas within Sacred Wind's service territory, and in areas in other surrounding rural communities, where customers that live near dense foliage or not clearly within Line of Sight ("LOS") of Sacred Wind's communications towers, are unable to receive service. For this reason Sacred Wind is working with Microsoft on Television White Space spectrum ("TVWS"), which holds high promise of being able to resolve the distance and LOS impediments that hinder the delivery of service to nearly 10 percent of its customers, and many more in surrounding rural areas, and is the reason that Sacred Wind submits these comments in support of Microsoft's Petition for Rulemaking ("Petition"). We urge the Commission to support the expansion and improvement of broadband connectivity to rural America by issuing a

Further Notice of Proposed Rulemaking proposing the practical rule changes Microsoft has identified.[1]

Sacred Wind's customers include students, parents, farmers and ranchers, patient home care providers, teachers and small business owners for whom broadband access is a critical tool for personal development and academic and economic advancement. Equally significant, Sacred Wind has found that the absence of broadband in some areas has disrupted families, causing parents who lack broadband in the home to send their children to live with relatives or to a Bureau of Indian Affairs dormitory so that their children can be more successful in school.[2] As the Commission knows, the 2019 Broadband Deployment Report indicated that 21.3 million Americans lack access to reliable broadband service, the overwhelming majority of whom live in rural America.[3] TVWS technology gives rural broadband providers a powerful tool to address this challenge. It radically improves the economics of deploying new service because signals transmitted over TVWS frequencies travel much farther than is possible in other bands available to wireless broadband

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1 Petition for Rulemaking of Microsoft Corporation, ET Docket No. 14-165 (filed May 3, 2019) ("Petition").

2 *From customer DH*: "Her son and his 3 boys moved back home to live with her ... Lifeline allowed her to get internet at an affordable rate. Her grandkids use the internet for leapfrog and reading books." *From customer SC*, *Pinedale Chapter*: [the couple] "have 4 children between the ages of 4 and 13 who stay with their grandmother during the week to go to school in Crownpoint because there was no internet at their parent's home. The children were even reluctant to visit their parents on the weekends because of no internet …. Mrs. C. thanked Sacred Wind "for reuniting our family."

3 *Inquiry Concerning Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion*, 2019 Broadband Deployment Report, FCC 19-44(2019).

providers. This would allow Sacred Wind, using existing communications tower facilities, to deliver wireless service to large geographic areas that would otherwise be impossible to serve economically. For example, we have identified over 300 homesites within our study area that are not within LOS or are distant from one of our existing towers, such as at the Nagheezi and the Huerfano Chapters of the Navajo Nation where scores of homes lie beyond the reach of 3.65 Ghz and 5.8 Ghz spectrum utilized today. There exist over 100 homes within the municipal boundaries of Grants, New Mexico where foliage impedes the signal from antennae operating at those spectrum. TVWS would allow us to serve those homes and many more.

Microsoft has developed the proposals contained in its Petition through its work with us. These practical, real-world solutions are the fruit of our combined efforts to push further into rural areas. We, therefore, strongly support the Petition because these changes to the TVWS rules will significantly enhance our ability to connect rural Americans. As the Petition explains, the Commission can free up significant additional TVWS spectrum capacity by permitting (1) higher-power operation in less congested, rural areas; (2) higher-power operation on first-adjacent channels; (3) higher deployment heights above average terrain; (4) fixed devices on moveable platforms in certain geofenced areas; and (5) narrowband operations for Internet of Things ("IoT") applications in industries such as agriculture.

The Commission can adopt these rule changes without risking harmful interference to existing broadcasting services by adopting the technical and operational parameters described in the Petition. Like the Commission, we are committed to expanding broadband in rural communities and working to ensure no American is left behind in this new era of

digital innovation. The spectrum already opened up through the TVWS proceeding has allowed us to begin the important work necessary to achieve that goal. The changes outlined in the Petition will allow us to build on that work and connect even more of rural America.

II. THE COMMISSION SHOULD ISSUE A FURTHER NOTICE OF PROPOSED RULEMAKING THAT PROPOSES CHANGES TO THE PART 15 RULES TO IMPROVE THE ABILITY OF INTERNET SERVICE PROVIDERS TO REACH CUSTOMERS IN RURAL AREAS.

The rule changes Microsoft proposes will improve the ability of rural broadband providers to provide service to difficult-to-reach areas and will open up TVWS technology to new groups of users and use cases. We submit these Comments to explain how each proposed rule change will support rural service providers' efforts to build networks and expand connectivity.

Increasing radiated power in less-congested areas. First, increasing the radiated power limit in less-congested areas from 40 dBm to 42 dBm[4] will allow network engineers to provide better access in challenging geographies and will give networks better coverage and flexibility. Increasing radiated power by allowing greater directional gain will directly improve the cost-to-coverage ratio for providers and allow them to serve more Americans by allowing more homes to be served from a single tower. Of Sacred Wind's 32 towers and relay monopoles, about one-third of them could take advantage of TVWS spectrum to reach homes inaccessible to 3.65 Ghz and 5.8 Ghz spectrum. Importantly, because increased radiated power would be matched by increased minimum separation distances

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[4] *See* Petition at 4.

from broadcasters' protected contours, this change would present no additional risk of harmful interference. The Commission's methodology for calculating separation distances to protect broadcasters has proven effective in the years since those rules were adopted, and this change would simply apply that same methodology across a larger range of power levels.

Permitting higher power in first adjacent channels. Microsoft's proposal to develop rules permitting higher-power TVWS device operations in first-adjacent channels would also open up important new opportunities for rural broadband providers. Current rules require 6 MHz of frequency separation or large physical distances from protection contours for our companies to use power levels we need to provide fixed broadband services.[5] Today's rules therefore require that we find three contiguous white space channels just to be able to use the one middle channel for our networks. However, broadcasters are spread across frequencies rather than being grouped in contiguous blocks of spectrum. The result is that, even in rural areas, finding three contiguous white spaces is often difficult, making many empty channels effectively unavailable for rural broadband—today's rules result in much of the band being used by neither broadcasters nor internet service providers, but instead lying fallow.

The Commission should adopt rules that allow this significant amount of fallow guard-band spectrum to be put to productive use—making even one or two more channels available will result in orders of magnitude of improved coverage capability for rural

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[5] *See* 47 C.F.R. § 15.712(a)(2).

connectivity. The Commission could permit TVWS operations in first-adjacent channels without increasing the chance of harmful interference to broadcasters by adopting more stringent out-of-band-emissions masks. The FCC could also explore ways to allow our TVWS devices to operate closer to television transmitters, where the signal at the television receiver is sufficiently strong to prevent harmful interference, while preventing the use of TVWS devices at the edge of broadcast contours.[6] Allowing TVWS database operators to use the more accurate Longley-Rice propagation model, which better accounts for the shielding effect of terrain, would facilitate adjacent channel operations by producing more accurate signal strength predictions for both TVWS and broadcast signals in addition to facilitating more efficient use of TVWS spectrum overall.[7]

Allowing additional HAAT. The Commission should also permit fixed TVWS device operations at up to 500 meters height above average terrain ("HAAT"). Doing so will significantly improve signal coverage in rural areas and will reduce deployment cost and time.[8] The current limit of 250 meters, combined with the averaging function of the HAAT value, unnecessarily restricts TVWS device operators' ability to provide broadband service. Sacred Wind possesses two communications towers situated above 250 meters HAAT used for subscriber distribution and for backhaul, for example, and has surveyed other areas for new tower installations that are above 250 meters HAAT, that could otherwise

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6 *See* Petition at 7–8.

7 *See id.* at 9.

8 *See id.* at 11.

accommodate TVWS antennae in order to serve many homes beyond reach of other spectrum.[9] By increasing the HAAT limit, the Commission would allow us to better use existing structures and terrain features for deployment, which would make service more affordable and more effective. The Petition's new proposed separation distances (calculated using a methodology the Commission has provided[10]), combined with its proposed coordination requirement, provide a specific plan for the Commission to increase the HAAT limit while preventing harmful interference.[11] This increase will allow us to successfully deliver service to more customers in underserved areas.

Permitting TVWS operation in geofenced areas. Permitting fixed TVWS device operations on moveable platforms using geofencing technology will allow residents, students, and workers in rural areas to access the internet in communities where they otherwise might not always have reliable access.[12] Allband Communications' experimental operations in Hillman, Michigan using school bus deployments and John Deere's waiver for the use of fixed TVWS devices on mobile agricultural equipment demonstrate that fixed devices on mobile platforms can provide a crucial "last-mile" link to the internet in the places where it is most necessary.[13] Because the commute to school by bus for many

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9 Gibson Peak tower; Mt. Taylor tower; Chaco Mesa tower site; Twin Buttes tower site.

10 *See* 47 C.F.R. 15.709(b)(2).

11 *See* Petition at 12–14.

12 *See id.* at 22.

13 *See* Matt Morgan, *Microsoft to Use TV White Space to Put Wi-Fi on Rural School Buses*, EdTech (May 2, 2018), https://edtechmagazine.com/k12/article/2018/05/microsoft-to-use-tv-white-space-to-put-wifi-on-rural-school-buses-; Application of Microsoft Corporation, Form 442 Exhibit 1: Experiment Description, ELS File No. 0049-

Navajo children takes up to two hours, one way, enabling the school district's use of TVWS spectrum during their commute could be extremely advantageous for the students. The Allband and John Deere's innovative deployments demonstrate that operations at the higher EIRP limits of fixed TVWS devices within a well-defined area pose no additional risk of harmful interference to broadcast users.

Adjusting FCC rules to support IoT. Finally, we support new rules to clarify application of TVWS spectrum for narrowband IoT applications to allow the benefits of IoT connectivity to reach more sectors of the economy in rural areas. For maximum clarity, the Commission should permit a new type of device class—the narrowband TVWS device—to operate in TVWS spectrum.[14] The current rules include technical restrictions to protect against interference from higher-power TVWS devices using 6-MHz channels, but could be interpreted to inadvertently limit IoT applications at equivalent power levels. The Commission should define the new class of narrowband TVWS devices as fixed or personal/portable devices operating in a bandwidth of no greater than 100 kHz that incorporate a listen-before-talk spectrum access mechanism.[15] Using the technical parameters and restrictions outlined in the Petition, the Commission can enable new, innovative uses of TVWS spectrum in the agriculture, mining, and environmental monitoring sectors while continuing to protect existing users from harmful interference.

EX-CM-2018, Call Sign WJ2XCD (filed Mar. 7, 2018); *Deere & Company Request for Limited Waiver of Part 15 Rules for Fixed White Spaces Device*, Order, 31 FCC Rcd. 2131 (2016).

[14] *See* Petition at 16.

[15] *See id.* at 18.

III. CONCLUSION

The Petition provides specific and well-defined interference prevention mechanisms for each of the proposed rule changes, and the Commission should move forward with an FNPRM that proposes incorporating these changes into the existing rules. Doing so will substantially improve access to broadband in our communities and will advance the Commission's goal of extending broadband connectivity to all Americans.

Respectfully submitted,

John W. Badal, CEO
Sacred Wind Communications, Inc.

June 5, 2019